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(54) Manufacturing floor coverings

(57) A continuous method of manufacturing floor covering (e.g. carpet or carpet backing) comprises the steps of laying a fluent mass 13 of vulcanisable elastomeric material in sheet form on a continuously moving conveying means 14. A substrate (e.g. carpet 19 or glass fibre scrim, non woven polypropylene or polyester or paper) is applied in sheet form on to the moving fluent mass of elastomeric material; and pressure bonding the substrate and the elastomeric material together (e.g. by a nip 17) to form the floor covering.

FIG. 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1990.

This print incorporates corrections made under Section 117(1) of the Patents Act 1977.

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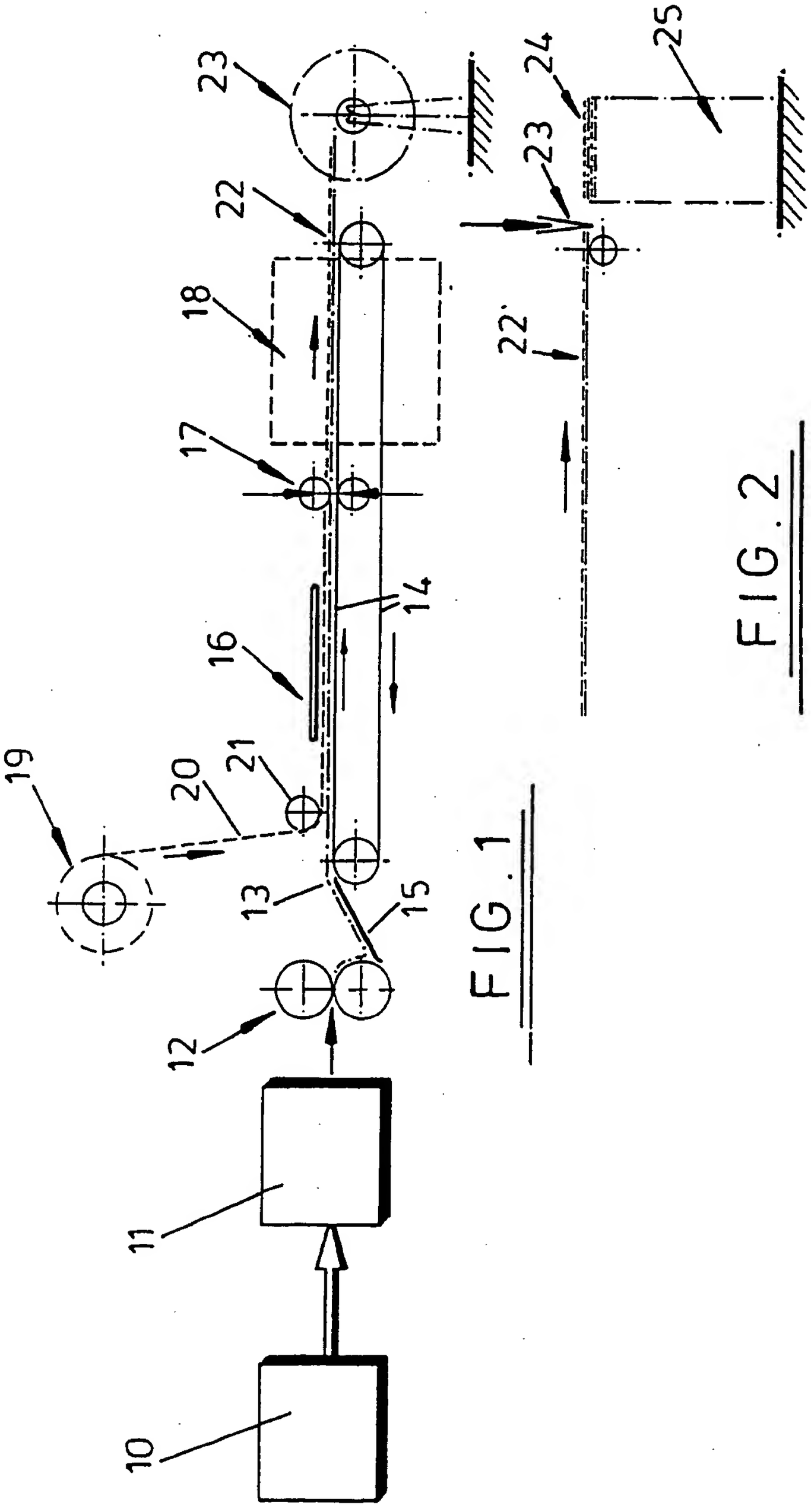

FIG. 1

FIG. 2

FLOOR COVERING

The present invention relates to the manufacture of floor covering materials, for example carpeting (especially but not exclusively carpet tiles) and carpet backing which may be used for the manufacture of carpet.

The terms "carpet" and "carpeting" used herein include any form of carpet structure such, for example, as tufted, woven and non-woven, and any other suitable form of floor covering structure.

According to this invention there is provided a continuous method of manufacturing floor covering material comprising the steps of laying a fluent mass of vulcanisable elastomeric material in sheet form, and preferably of a controlled thickness, on a continuously moving conveying means; applying a substrate in sheet form on to the moving fluent mass of vulcanisable elastomeric material; and pressure bonding the substrate and the elastomeric material together to form the floor covering material.

Preferably the fluent mass of vulcanisable elastomeric material is calendered on to the continuously moving conveying means.

Preferably the vulcanisable elastomeric material includes cross-linking agents or compounds to assist and ensure curing and adhesion of the material.

The vulcanisable elastomeric material may be a hydrocarbon conjugated diene elastomer and is preferably a butadiene styrene copolymer.

The vulcanisable elastomeric material may alternatively, inter alia, be a nitrile or natural rubber.

Preferably, the method includes the sequential steps of heating the fluent mass of vulcanisable elastomeric material, pressure bonding the substrate and the vulcanisable elastomeric material together by, for example, passage through a pressure nip, cooling the floor covering material constituted by the bonded substrate and vulcanisable elastomeric material, and collecting the floor covering material in roll form for example for storage and/or transport.

The vulcanisable elastomeric material preferably includes a chemical blowing agent.

Preferably, the method includes the step of using a non-smooth surfaced conveying means to impose a pattern on the carpet-remote

surface of the vulcanisable elastomeric material.

In accordance with a first embodiment of the invention, the method is used for the manufacture of carpeting in which case the substrate is a carpet. Where carpet tiles are to be produced in accordance with this embodiment, the carpeting (after cooling) is severed into predetermined lengths, which lengths are stacked and the stack is subjected to a cutting action to produce carpet tiles of a predetermined area.

In accordance with a second embodiment of the invention, the method is used for the manufacture of carpet backing which may subsequently be bonded (e.g. by adhesive) to a carpet to produce carpeting. In this case the substrate may be inter alia a glass fibre scrim, a non-woven polyester or polypropylene, or paper.

Also according to this invention there is provided carpeting or carpet tiles produced either directly by the first embodiment described above or by bonding a carpet to a carpet backing obtained by the second embodiment.

The carpeting (and in particular the carpet tile product) of the present invention is, due to the provision of the bonded vulcanisable material, a cushioned floor covering which generally performs better than other forms of carpeting or carpet tiles.

The carpeting according to this invention, compared with existing carpeting or carpet tiles and especially but not exclusively bitumen-backed or PVC-backed carpeting or carpet tiles, has increased comfort and aesthetic qualities, has better wearability characteristics, has greater noise absorption capabilities and greater thermal resistance. It is also considered to be easier to dry suction clean.

An example of the present invention will now be described with reference to the accompanying diagrammatic drawings, in which

Fig. 1 illustrates the method of manufacturing carpeting according to this invention; and

Fig. 2 illustrates an additional manufacturing stage for carpet tile manufacture.

The method of manufacture is a continuous one.

The raw materials including cross-linking agents or compounds forming the fluent mass of vulcanisable elastomeric material, preferably but not exclusively a butadiene styrene copolymer, are mixed together

in a mixer 10 from which they pass, now thoroughly intermixed, to a storage and heating unit 11 from which the fluent mass of copolymer is delivered to a continuously rotating calendar 12, whose output is a calendered sheet 13 of fluent copolymer.

The fluent copolymer sheet 13 is laid flat on a continuously-moving endless belt conveyor 14, which may have a patterned or smooth surface, via a guide conveyor 15 if necessary.

The latter may be omitted, the calendar 12 feeding the conveyor 14 directly.

The conveyor 14 passes through a heating section 16, which may be, inter alia, an oven, a heated platen or a heated box; a pressure bonding section 17 which may be a pressure nip; and a cooling section 18 which may be air cooling or involve the use of water-cooled rollers.

A supply 19 of carpeting in rolled sheet form is provided above and adjacent the input end of the conveyor 14 and the carpeting 20 is fed towards the latter and is laid on the sheet of fluent copolymer 13 on the conveyor 14 by a guide roll 21.

The carpeting 20 adheres to, and is carried along by, the copolymer 13 being conveyed by the conveyor 14 through the heating, bonding and cooling stages 16 to 18, the carpeting 20 and fluent copolymer mass 13 being pressure bonded together into a unitary carpeting product at 17.

The copolymer mass 13 during its passage through the heating stage 16 is allowed to flow and blow and, if desired, be patterned aesthetically.

The copolymer mass 13, while in its visco-elastic state, is pressure bonded to the carpeting 20 at the pressure nip 17 and is allowed to cool and cure on its passage, as part of the unitary carpeting product 22, through the cooling stage 18.

The carpeting 22 is then collected in a roll 23 for storage and/or transport.

If it is desired to produce carpet tiles (see Fig. 2), the carpeting 22 is severed as indicated at 23 into sections 24 of predetermined length, which sections 24 are stacked as indicated at 25 and subsequently subdivided into the required areas of carpet tiles.

The abovedescribed method may also be used for the manufacture of carpet backing material in which case the roll of carpet is replaced

by a roll of a, for example, glass fibre scrim, a non-woven polyester, or paper. The carpet backing thus obtained may if desired be rolled prior to transport to another location at which it is bonded to a carpet layer.

In the manufacture of such carpeting, the carpet layer and the elastomeric layer and its supporting substrate are preferably bonded together by a hot melt system layer. The hot melt system layer or layers may, inter alia, be constituted by bitumen, ethylvinyl acetate, attatic polypropylene or polyvinylchloride (all hereinafter for convenience referred to simply as "bitumen"). Other bonding or adhesive systems may be employed in the present invention and the use of the term "hot melt system" is to be construed accordingly.

To produce the carpeting, the elastomeric layer and its supporting substrate may be laid out in flat sheet form usually on a conveyor but not necessarily so with the substrate uppermost, a hot melt system layer in fluent form is applied to and spread over the elastomeric/substrate layer, and carpet is laid over the latter and is bonded thereto as the hot melt system layer cools.

The carpeting thus formed may then be collected in the piece in roll form for example, or it may be formed, in conventional manner, into carpet tiles.

The carpeting or carpet tiles resulting from this procedure have a comfort characteristic with stiffness and dimensional stability which may be loose laid.

Examples of the present invention will now be described.

Carpeting produced according to this procedure may incorporate more than one hot melt system layer and/or more than one rubber/substrate layer.

Possible carpeting or carpet tile constructions or configurations are:

(A) top layer carpet, intermediate layer elastomer/substrate bottom layer bitumen.

(B) top layer carpet, intermediate layer bitumen, bottom layer elastomer/substrate.

(C) top layer carpet, first and upper intermediate layer bitumen, second and lower intermediate layer elastomer/substrate bottom layer bitumen.

The above are only examples and are not restrictive

combinations or configurations.

CLAIMS

1. A continuous method of manufacturing floor covering comprising the steps of laying a fluent mass of vulcanisable elastomeric material in sheet form, and preferably of a controlled thickness, on a continuously moving conveying means; applying a substrate in sheet form on to the moving fluent mass of vulcanisable elastomeric material; and pressure bonding the substrate and the elastomeric material together to form the floor covering.

2. A method as claimed in claim 1 wherein the fluent mass of vulcanisable elastomeric material is calendered on to the continuously moving conveyor means.

3. A method as claimed in claim 1 or 2 wherein the conveying means is patterned.

4. A method as claimed in any one of claims 1 to 3 wherein the vulcanisable elastomeric material is hydrocarbon conjugated diene elastomer.

5. A method as claimed in claim 4 wherein the elastomer is a butadiene styrene copolymer.

6. A method as claimed in anyone of claims 1 to 3 wherein the vulcanisable elastomeric material is a natural rubber or a nitrile rubber.

7. A method according to any one of claims 1 to 6 wherein the vulcanisable elastomeric material includes cross-linking agents or compounds to assist and ensure cooling and adhesion of the material.

8. A method according to any one of claims 1 to 7 wherein the vulcanisable elastomeric material includes a chemical blowing agent.

9. A method as claimed in any one of claims 1 to 8 including the step of heating the fluent mass of vulcanisable elastomeric material prior to said pressure bonding.

10. A method as claimed in any one of claims 1 to 8 wherein the pressure bonding is effected by passage of the substrate and the vulcanisable elastomer through a pressure nip.

11. A method as claimed in any one of claims 1 to 11 for the manufacture of carpeting wherein said substrate is a carpet.

12. A method as claimed in claim 11 wherein said carpeting is cut to form carpet tiles.

13. A method as claimed in any one of claims 1 to 10 for the manufacture of a carpet backing.

14. A method as claimed in claim 13 wherein the substrate is glass fibre scrim, a non-woven polypropylene or polyester, or paper.

15. A method of producing carpeting comprising bonding a carpet to a carpet backing as produced by the method of claim 13 or 14.

16. A method as claimed in claim 15 wherein said bonding is effected by a hot melt system layer.

17. A method of producing floor covering substantially as hereinbefore described with reference to the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

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Relevant Technical fields

(i) UK Cl (Edition 5) B5N, B2E

(ii) Int Cl (Edition K) B32B, D06N

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI, CLAIMS

Search Examiner

R J MIRAMS

Date of Search

27 AUGUST 1992

Documents considered relevant following a search in respect of claims 1 TO 17

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2057353 A (SIDLAW) whole document	1, 11
X	GB 1441141 A (POLYFLEET) whole document	1,2,9,10, 11, 12
X	GB 1432781 A (SIDLAW) eg figures 2 to 7	1,8,9,11, 12,13,14, 15, 16
X	GB 1134225 A (FISONS) whole document	1,8,9,10, 11
X	GB 0923142 A (SEMTEX) whole document	1,2,4-12
X	US 4512831 A (TILLOTSON) whole document	1,8,9,10, 11, 13
X	US 3423263 A (PANNONE) whole document	1,3,8,9, 10, 11

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

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P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

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Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

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